July 1987 Vol. XII No. 7

ENDANGERED SPECIES

Technical Bulletin

Department of interior. U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

Twelve New Listings Approved

During June 1987, five animal and seven plant taxa were added to the Federal list of Endangered and Threatened species. These approved listing actions are summarized below:

Flattened Musk Turtle (*Sternotherus depressus*)

A small freshwater turtle with a distinctively flattened carapace, this species is endemic to the Black Warrior River system in Alabama. Its numbers and range, already reduced, are threatened by collectors, disease, and habitat degradation from siltation and water pollution. The flattened musk turtle was proposed for listing in the November 1, 1985, *Federal Register* (see summary in BULLETIN Vol. X No. 12) as a Threatened species, and the final rule was published June 11, 1987.

Alabama Red-bellied Turtle (*Pseudemys alabamensis*)

Another freshwater turtle from Alabama, *P. alabamensis* inhabits the lower floodplain of the Mobile River drainage in Baldwin and Mobile Counties. The only known area repeatedly used for nesting is an island in the Tensaw River. Turtle populations nesting at this site are threatened by high rates of egg predation (mostly by fish crows, *Corvus ossifragus*) and heavy disturbance by people that use the island beach for recreation. Both factors result in a low reproductive success rate for the turtle. Trapping and sale of turtles for food and the pet trade further threaten the species. The Alabama red-bellied turtle was proposed for listing on July 8, 1986 (summary in BULLETIN Vol. XI No. 8), and the final rule listing it as Endangered was published June 16, 1987.

Mount Graham Red Squirrel (*Tamiasciurus hudsonicus grahamensis*)

This subspecies is found only within Coronado National Forest in the Pinaleno Mountains of southeastern Arizona. The restricted and isolated habitat of the Mount Graham red squirrel has declined significantly over the past century and may face additional losses from logging, recreational development, and construction of a major astrophysical facility. Other potential threats are the subspecies' small population size (about 265 individuals) and competition from an introduced, non-native squirrel species. The May 21, 1986, proposal to list the Mount Graham red squirrel as Endangered (summary in BULLETIN Vol. XI No. 6) was made final June 3, 1987; however, final action on a Critical Habitat proposal has been delayed for further study. A final Critical Habitat decision must be reached no later than May 21, 1988. In the meantime, other habitat protection measures under Section 7 of the Endangered Species Act are already in effect.

Florida Scrub Jay (*Aphelocoma coerulescens coerulescens*)

Found only in central peninsular Florida, this subspecies is another victim of the region's loss of native scrub habitat. The Florida scrub jay occurs in some of the most rapidly developing real estate in Florida. At least 40 percent of former sites no longer support the bird, and the total population has declined by one-half over the past 100 years. This subspecies was proposed May 21, 1986, for listing as Threatened (summary in BULLETIN Vol. XI No. 6), and the final rule was published June 3, 1987.

Blackside Dace (*Phoxinus cumberlandensis*)

The blackside dace is a 3-inch, brightly colored fish that inhabits small streams within the upper Cumberland River basin in extreme southeastern Kentucky and northeastern Tennessee. Its range is believed to have declined substantially due to siltation and other water quality problems. Surveys indicate that segments of only 9 streams, totalling 8 stream-miles, still contain healthy populations. Because of continuing threats to the fish, the Service proposed May 21, 1986, to list it as a

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Alligator Reclassified Rangewide

The American alligator (*Alligator mississippiensis*), a reptile once in danger of extinction, has recovered to the point that the Fish and Wildlife Service recently removed if from classification as a Threatened and Endangered species (F.R. 6/4/87). It will remain, however, under a "Threatened due to Similarity of Appearance" (T/SA) classification as a means of protecting still-jeopardized crocodilian species that have similar hides.

Concern about poorly regulated or unregulated exploitation for the hide industry led the Service in 1967 to federally list the alligator as Endangered. Its comeback has been a major success story. Under State and Federal protection, the alligator began to recover in areas of Louisiana, Texas, and Florida as early as 1975. As its numbers increased, the alligator was reclassified to Threatened in coastal areas of Georgia and South Carolina, and T/SA in Louisiana, Texas, and Florida. The June 4, 1987, reclassification of the remaining areas to T/SA recognizes the recovery of the species rangewide.

Under the T/SA classification, States are responsible for management of alligators and may conduct commercial hunting seasons. Data gathered in recent years by Louisiana and Florida wildlife agencies indicate that, with proper management, past mistakes can be avoided and overhunting should no longer be a threat.

Although the American alligator is no longer believed to be in danger of extinction, a number of other crocodilian species with hides of similar appearance remain very vulnerable. The category of T/SA, described in Section 4(e) of the Endangered Species Act, permits Federal controls and monitoring in the trade of species thus classified in order to facilitate the protection of other species still listed as Endangered or Threatened. A tagging system will allow law enforcement personnel to distinguish between legally taken alligators and illegally taken crocodilians.

Further details on the reclassification are available in the June 4, 1987, *Federal Register*.

Regional News

Endangered species program regional staff members have reported the following activities for the month of June:

Region 1 - A second colony of the palmate-bracted bird's-beak (*Cordylanthus palmatus*), containing about 800 plants, was confirmed at the Mendota Wildlife Area in California's Central Valley. The original colony, which was transplanted, was apparently destroyed by a flood in 1984. The native habitat of the bird's-beak on the Mendota Wildlife Area occurs in a remnant alkali-scrub community.

* * *

The Sacramento Endangered Species Office staff investigated a new locality for the rough sculpin (*Cottus asperrimus*) in Lost Creek, part of the Hat Creek drainage in Shasta County, California. This locality was reported in a survey undertaken for the permit applications for three small hydroelectric projects. The rough sculpin is listed by the State of California as threatened and is a Category-2 candidate for a future Federal listing. Voucher specimens have been sent to taxonomic authorities for confirmation of the field identification.

* * *

One of the nine Hawaiian crows (*Corvus hawaiiensis*) at the Olinda Endangered Species Breeding Facility on the island of Maui died from egg impaction in the oviduct on June 10, 1987. It was the only bird at the facility to lay any eggs this year. It's two eggs were fertile, but the embryos survived for only about 2 days. The adult crow's carcass is being sent to the National Wildlife Health Lab in Madison, Wisconsin, for a more thorough necropsy. It is estimated that fewer than 18 of the species remain.

* * *

The Environmental Protection Agency has approved an Animal and Plant Health Inspection Service proposal to spray the island of Rota, Commonwealth of the Northern Mariana Islands, with a mixture of a pheromone and malathion for the control of fruit flies. The Fish and Wildlife Service believes the fruit fly eradication effort will not likely adversely affect the Endangered Mariana crow (*Corvus kubaryi*), the only listed species known to be on the island.

* * *

The first group of peregrine falcons (*Falco peregrinus*) were sent from the Peregrine Fund's facility in Boise, Idaho, to hack sites in Montana, Idaho, Wyoming, Oregon, and Washington. The Peregrine Fund anticipates that a total of 125 birds will be placed at hack sites or used to augment natural eyries this year.

* * *

Since the outmigration of cui-ui (*Chasmistes cujus*) larvae has been completed, flows for this fishery from Stampede Reservoir on Nevada's Truckee River have been terminated. About 100,000 cubic feet of water was used for this year's cui-ui spawning run.

* * * *

Recent surveys have documented that the Delta smelt (*Hypomesus trans-*

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U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2**: Arizona, New Mexico, Oklahoma, and Texas. **Region 3**: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4**: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the Virgin Islands. **Region 5**: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6**: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7**: Alaska. **Region 8**: Research and Development nationwide.

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pacificus) is experiencing a significant decline. On the basis of information presented at the annual meeting of the California-Nevada Chapter of the American Fisheries Society, the Sacramento Office recently recommended the addition of this fish to the Notice of Review of Vertebrate Wildlife as a Category-1 listing candidate. The Sacramento splittail also was recommended as a candidate species (Category 2).

Region 2 - June surveys by Canadian Wildlife Service biologists indicated at least 24 whooping crane (*Grus americana*) chicks had hatched at Wood Buffalo National Park, Canada. Two late nests, established by new pairs, were discovered, making a new total of 32 nests. During the May egg transfers, biologists discovered a female whooping crane sitting on a nest although a predator had destroyed the eggs. They placed in the nest a good egg from another nest that contained two eggs. The pair of whoopers who lost their own eggs to a predator now have a big chick from the substitute egg. All of the 12 eggs transferred from Canada to Grays Lake National Wildlife Refuge, Idaho, have successfully hatched. Water conditions in Canada, and at Grays Lake (where there were 5 inches of rainfall in late May and early June), are satisfactory for chick rearing.

* * *

Since 1975, individuals involved in sandhill crane (*Grus canadensis*) and whooping crane research and management have met for a workshop every 3 years. Meeting announcements and the invitations for papers have been mailed for the next workshop, which is scheduled for late February 1988 near Orlando, Florida. Dr. James Lewis, the Service's Whooping Crane Coordinator, and Steve Nesbitt of the Florida Game and Fresh Water Fish Commission will be the co-chairmen of this workshop.

* * *

The Wyoming Cooperative Fishery and Wildlife Research Unit completed its second spring monitoring sandhill crane collisions with powerlines in Nebraska. In this project, the sandhill cranes are being used as a research surrogate species, substituting for the much rarer whooping crane. Collisions with powerlines are the number one cause of fledged whooping crane losses. The study is investigating factors that influence collisions and sections of lines suitable for testing the efficiency of line identifying markers in reducing collisions. The researchers found 75 dead sandhill cranes beneath lines this spring and observed collisions on 6 occasions in which the cranes were injured but able to leave the vicinity of the lines. Unit personnel have prepared a proposal for coopera-

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Texas Plant Proposed for Listing Protection

The large-fruited sand-verbena (*Abronia macrocarpa*), a herbaceous perennial in the four-o'clock family (Nyctaginaceae), is endemic to Leon County in eastern Texas. Only one small population is known, and it faces threats from residential development, recreation, and commercial use. Because this species is believed to be in danger of extinction, the Fish and Wildlife Service has proposed to list it as Endangered (F. R. 6/16/87).

Restricted to actively blowing sand dunes in the post oak and grassland mosaic vegetation types, the large-fruited sand-verbena is one of the many herbaceous species that temporarily dominate the bare sands during spring. The only known population occurs on dunes that lie entirely within a residential resort community. Although the dunes cover approximately 30 acres, the area occupied by *A. macrocarpa* is much less. In 1986, the Service estimated that the population contained about 250 plants. Residential expansion and recreational activities (e.g., horseback riding, off-road vehicle use) associated with the surrounding resort community already have destroyed some habitat. The landowner has been informed of the species' presence, and the Service plans to develop a cooperative management strategy that will accommodate *A. macrocarpa* habitat. Nevertheless, because the plant is so rare and is restricted to such a small area, it remains vulnerable to extinction.

Comments on this listing proposal are welcome, and should be sent to the Regional Director, Region 2 (address on page 2 of this BULLETIN), by August 16, 1987.

Available Conservation Measures

Among the conservation benefits provided to a species if its listing under the Endangered Species Act is approved are: protection from adverse effects of Federal activities; prohibitions against certain practices; the requirement for the Service to develop and implement recovery plans; the authorization to seek land purchases or exchanges for important habitat; and the possibility of Federal aid to State or Commonwealth conservation departments that have signed Endangered Species Cooperative Agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages further conservation efforts by State and local agencies, independent organizations, and individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of a listed species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are non-binding.

Further protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or traffic in listed animals except by permit for certain conservation purposes. For plants, the rule is different; the prohibition against collecting applies only to listed plants found on lands under Federal jurisdiction. Some States, however, have their own laws against take of listed plants.

photo by Charles McDonald

Showy pink-purple flower clusters make* Abronia macrocarpa *an attractive part of the spring wildflower display in Texas. From 20 to 75 flowers are arranged in each spherical nodding head, which is about the size of a golf ball or larger. The plant's stems bear hairy leaves and can reach 20 inches in height.

Changes in Classification of Zimbabwe Crocodiles

In the June 17, 1987, *Federal Register*, the U. S. Fish and Wildlife Service published a final rule reclassifying ranched populations of the Nile crocodile (*Crocodylus niloticus*) in Zimbabwe from Endangered to Threatened. Also published was a proposal to give the same classification to wild crocodile populations in that country.

Originally, the Service had proposed to reclassify ranched crocodile populations in Zimbabwe to the special category of "Threatened due to Similarity of Appearance" or T/SA (see summary in BULLETIN Vol. XI No. 4). Such a designation would have recognized their recovery but regulated trade in ranched Nile crocodiles in order to protect wild populations of this species as well as other crocodilians that still need protection. However, because the crocodile ranches remain somewhat dependent on wild eggs for replenishing their stock and because wild populations are still threatened to a degree by poaching, the Service now believes that a reclassification of ranched populations to the category of Threatened (rather than T/SA) is more appropriate.

At the 1983 meeting of parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), both ranched and wild populations of the Nile crocodile in Zimbabwe were moved from Appendix I to the less restrictive Appendix II. The Service's reclassification of ranched Nile crocodiles in Zimbabwe under the Endangered Species Act from Endangered to Threatened is consistent with the new CITES classification. Under a special rule, it is now legal to import live ranched Zimbabwe crocodiles or whole skins into the U. S., provided that all applicable CITES regulations and Zimbabwe laws are met. Even though ranched populations still face some threats, the Service believes they can withstand regulated commercialization.

Simultaneously with the final rule on ranched Nile crocodiles in Zimbabwe, the Service proposed to reclassify *wild* populations in Zimbabwe also to Threatened. Wild as well as ranched Nile crocodiles have benefitted from management as a sustainable resource under Zimbabwe law and, although current population levels are probably lower than historical ones, the Service believes that wild crocodiles in that country are no longer in imminent danger of extinction.

If the proposal is made final, importation into the U. S. of sport-hunted crocodile trophies from wild populations in Zimbabwe will become legal under Section 9(c)(2) of the Endangered Species Act, provided that all Zimbabwe laws and CITES rules are followed. However, because the Service continues to believe that there is not enough information to demonstrate that wild Nile crocodile populations can withstand commercialization, commercial import into the U.S. of skins from wild populations will remain prohibited.

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Comments on the proposal to reclassify wild Nile crocodile populations in Zimbabwe from Endangered to Threatened are welcome, and should be sent to the Assistant Director, Fish and Wildlife Enhancement, Office of Endangered Species, U. S. Fish and Wildlife Service, Washington, D.C. 20240, by September 17, 1987.

The Endangered classification for *all* Nile crocodile populations in countries other than Zimbabwe remains in effect.

Regional News

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tive research along the Platte River with several utility companies in central Nebraska. If the companies respond favorably, the testing of line markers will occur in 1988 and 1989.

* * *

Dr. R. Douglas Slack and Howard Hunt, Texas A&M University, have completed their studies of managed grazing and prescnbed burning at Aransas National Wildlife Refuge in Texas. These experimental practices were directed at improving upland habitat for whooping cranes. Crane use increased on recently burned units, apparently in response to the increased ability of the birds to walk about and see potential predators, and because of the more accessible foods (acorns, insects, berries). They recommended eliminating grazing from the upland habitats because it reduces the abundance of crane foods and may be contributing to brush encroachment.

* * *

Early reports from the Kemp's ridley sea turtle (*Lepidochelys kempii*) nesting beach at Rancho Nuevo, Mexico, indicated that the number of nests was alarmingly short of previous years' production by about 40 percent. Happily, late nesting activity has increased the number of nests to levels comparable to other seasons. Over 570 nests were protected as of June 24, 1987. The total number of nests for this season will be known by September.

* * *

Prototype satellite transmitters used to track movements on an 8-to-10-day interval were attached to two Kemp's ridley females at Rancho Nuevo on May 10 and May 29, 1987, by Richard Byles, Region 2's Sea Turtle Biologist. The transmitters were placed on the turtles after they had nested; both animals then swam from shore normally and headed north. Unlike previous models, the prototype transmitter is capable of measuring the temperature of the water where the turtles are swimming and provides a summary of diving information over 12-hour periods. The temperature and diving data can be obtained daily. In the future, software will be added to the transmitters so that depth information also can be collected. The data will provide answers to basic biological questions about where the turtles go, how much time they spend on the surface, and what types of water they prefer.

* * *

The U. S. Forest Service Research Station at Nacogdoches, Texas, recently completed an examination of red-cockaded woodpecker (*Picoides borealis*) colonies on the Angelina, Sabine, and Davy Crockett National Forests in eastern Texas. Researchers visited all known colonies on each forest: 62 on Angelina National Forest, 62 on Sabine National Forest, and 134 on Davy Crockett National Forest. Of the 258 colonies visited, researchers found only 22 active nests on the Angelina National Forest, 6 on Sabine National Forest, and 27 on Davy Crockett National Forest. Records from the Angelina National Forest Indicate that the number of active colonies has decreased from 38 in 1983 to 22 in 1986, a 43 percent decrease in a 4-year time span. A minimum of 25 active colonies were present on the Sabine National Forest in 1978, and only six active colonies remain in 1987 —a 76 percent decrease in a 9-year time span. The Angelina, Davy Crockett, and Sabine National Forest's experienced average annual declines of 10.5 percent, 8.6 percent, and 8.4 percent, respectively. These results show that the red-cockaded woodpecker populations on the three forests are in a severe decline and are in great danger of extirpation in the near future. The primary causes of this decline appear to be insufficient maintenance of old-growth stands of pine, encroachment of hardwoods, and excessive pine tree densities.

Region 5 - During the last 2 weeks of June, 22 bald eagle (*Haliaeetus leucocephalus*) young were donated by Can-

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ada to the U.S. Eight of the eaglets went to Massachusetts and the rest to Pennsylvania. They will be hatched out into the wild this August.

* * *

A Biological Opinion on Carbofuran, a granular insecticide used on corn and other crops, was signed and sent to the Environmental Protection Agency. Interagency consultation with the Service under Section 7 of the Endangered Species Act was reinitiated last year because of the poisoning death of two bald eagles in Virginia. The Biological Opinion contained conservation recommendations to minimize Carbofuran impacts on bald eagles.

Region 6 - In May, the U.S. District Court, Great Falls Division, Montana, decided against plaintiffs Richard P. Christy, Thomas B. Guthrie, and Ira Perkins in their suit against the Department of the Interior and Secretary of the Interior Donald P. Hodel. The plaintiffs had argued that the Endangered Species Act (Act) and Service protection of the grizzly bear (*Ursus arctos horribilis*) violated their constitutional rights to "possess and protect property." The plaintiffs had lost a number of sheep to grizzly bears. Christy killed one grizzly bear, was charged with violation of the Act, and fined $2,500. He was seeking to have the original decision dismissed, and the other plaintiffs were supporting him in his endeavors. The court disagreed with the plaintiffs' charges and affirmed the fine.

* * *

Peregrine falcon hacking efforts are paying off in Utah. Four towers previously used to release young falcons into the wild along the shores of the Great Salt Lake are occupied by pairs this year. Young birds have been produced at three of the four towers. The fourth pair did not produce any eggs, possibly because the female was not sexually mature. The objective of the hacking effort at these towers is to reestablish occupancy at historical eyries on the cliffs of the Wasatch Mountains to the east.

Region 8 (Research) - A 5-year-old whooping crane at the Patuxent Wildlife Research Center laid eggs for the first time on May 18. This is the first new female to produce eggs since 1982. A total of five Patuxent females have produced six eggs this year, and the first whooping crane chick of the 1987 breeding season hatched on May 8. The chick is being reared by a female Florida sandhill crane (*Grus canadensis pratensis*) that is a proven foster parent.

* * *

On May 8, three fertile greater sandhill crane (*Grus canadensis tabida*) eggs were flown from Patuxent to Florida for fostering into wild nests. The eggs are part of the ongoing cross-fostering experiment to determine the feasibility of introducing whooping cranes into a nonmigratory Florida sandhill crane flock.

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The captive breeding flock of bald eagles at Patuxent produced a total of 42 eggs in 1987; 15 eaglets were produced.

* * *

As part of the endangered Hawaiian forest birds research project, the first rat and predator survey on Mauna Kea has been completed by staff at Patuxent's Mauna Loa Research Station on the island of Hawai'i. Data are being analyzed to determine if there is any difference in the frequency of capture of these species between areas of high and low bird abundance.

* * *

A total of 21 eggs were produced by 4 known pairs of wild Puerto Rican parrots (*Amazona vittata*) in 1987; all eggs were fertile and 11 eggs hatched (8 chicks are in wild nests and 3 are in Patuxent's Puerto Rico Research Station aviary). In captivity, 4 breeding pairs have produced 37 eggs; 13 were fertile and 4 chicks have been produced. (See story in this BULLETIN on the Puerto Rican parrot.)

* * *

Biologists at Patuxent's Minnesota Research Station have determined that, in the winter of 1986-1987, the wolf (*Canis lupus*) population in the Superior National Forest experienced a 12 percent decline while the deer population increased 17 percent.

Court Halts Project Pending Reinitiation of Consultation and Disposition of Claims to "Mitigation" Lands

Laguna Niguel (California) Field Office

Acting only 5 weeks after oral arguments, the Ninth Circuit Court of Appeals directed the District Court for the Southern District of California to enjoin work on the Sweetwater River Flood Control Channel and the widening of Interstate Highway 5 (known together as the Combined Federal Project) in southern California.

The appeal was granted on the grounds that the local District Court earlier had looked only at whether or not damaging impacts to promised "mitigation" lands (quotations added) were imminent. Such impacts could result from another area development, the Chula Vista Bayfront Project. The Appeals Court ruled that impacts involving habitat of two Endangered birds, the California least tern (*Sterna antillarum browni*) and light-footed clapper rail (*Rallus longirostris levipes*), had been overlooked, and that reinitiation of consultation was required because of a change in effects of the action that had not been anticipated during the earlier consultation.

The Ninth Circuit held "that the Corps of Engineers is in violation of Section 7 (a) (2) by allowing destruction or adverse modification of any part of the birds' habitat without first insuring the acquisition and preservation of the mitigation lands."

The conclusion of the ruling states: "...the statute dictates that if an agency plans to mitigate its project's adverse effects on an endangered species by acquiring habitat and creating a refuge, it must insure the creation of that refuge before it permits destruction or adverse modification of other habitat. The Sierra Club is entitled to (1) an injunction against any work west of I-5 until the Federal defendant's cross claim is resolved, (2) a declaration that the Corps of Engineers violated the Endangered Species Act by refusing to reinitiate consultation, and (3) an injunction against all work on the project unless the Corps of Engineers reinitiates consultation within 30 days of the issuance of the mandate in this appeal, with the injunction continuing until such time as consultation is reinitiated."

History And Status Of The Endangered Puerto Rican Parrot

Sandra L. MacPherson
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The Puerto Rican parrot (*Amazona vittata*) has been on the verge of extinction for over 20 years. Its status, however, was once very different. Historical records show that it was abundant throughout the island of Puerto Rico and indicate that it once inhabited the adjacent Islands of Culebra, Vieques, and Mona. Biologists speculate that parrot numbers formerly may have exceeded one million individuals.

With European colonization of Puerto Rico in the 1500's, the parrot population began to decline steadily. The parrot's fruit-eating and cavity-nesting habits make it very dependent upon forests for its existence, and deforestation in the late 1800's increased the severity of its decline. A few decades later, parrots could no longer be found on any of the adjacent islands and were only known to exist in five areas of Puerto Rico.

By about 1940, Puerto Rican parrots could only be located in the Luquillo Mountains of eastern Puerto Rico, particularly within the 11,000-hectare (27,180-acre) Caribbean National Forest, the largest area of native vegetation left on the island. In addition to habitat destruction, taking of birds for pets, shooting of birds as farm pests, and illegal hunting contributed to the decline. Today, just over 80 parrots remain in existence — approximately 41 in the wild and 42 in captivity.

Concern for the parrot's plight led the Fishery and Wildlife Section of the Puerto Rican Commonwealth Department of Agriculture and Commerce (now the Puerto Rico Department of Natural Resources), with support from the U.S. Forest Service and the U.S. Fish and Wildlife Service to conduct an intensive study of the parrot and its nesting areas from 1953 to 1956. Following the decline of the parrot from an estimated 200 individuals in 1954 to 70 in 1966, the parrot was declared an Endangered species (1967). In 1968, the Fish and Wildlife Service and the Forest Service, with initial support from the World Wildlife Fund, began an intensive research program for Puerto Rican parrot recovery that continues today.

In spite of this research program, the wild parrot population continued to decline until it reached its lowest level in 1975, when only 13 individuals were known to exist. Since then, however, through the concerted efforts of dedicated biologists, the wild population has slowly increased to approximately 41 individuals today. Nest site improvements (e.g., measures to prevent the entrance of water into tree cavities), provision of artificial nest sites, exclusion of honeybees from nest sites, reduction of nest site competition from the more aggressive pearly-eyed thrasher (*Margarops fuscatus*), and combatting warble fly (*Philornis pici*) parasitism have allowed for enhanced reproduction of wild pairs. Also, parrot nests have been guarded during the breeding season for the past several years to provide protection to the breeding parrots, and their eggs and young, against predators like the red-tailed hawk (*Buteo jamaicensis*). In 1987, the nest watching effort was increased when the National Audubon Society provided seven volunteers to protect parrot nests as well as to collect information on parrot movements and behavior (see accompanying story).

Another conservation effort that has been very successful has been the manip-

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Volunteer Nest Watchers on the Puerto Rican Parrot Project Recognized

A ceremony was held in Puerto Rico on May 8 to recognize the significant contribution of seven National Audubon Society volunteers on the Patuxent Wildlife Research Center's Puerto Rican parrot project. The volunteers honored were Mark Duff, Gail Morgan, David McLain, Karen Wilson, Becky Abel, Greg Harris, and Greg Burkett. These individuals volunteered for 3 months or more to assist project biologists guarding Puerto Rican parrot nests and assisted in caring for birds at the Puerto Rico Research Station aviary. The ceremony, held at the U. S. Forest Service's Institute of Tropical Forestry, was attended by 18 individuals representing all of the cooperators on the parrot research and management project (U. S. Forest Service, Puerto Rico Department of Natural Resources, U. S. Fish and Wildlife Service, and National Audubon Society). Whitney Tilt, wildlife specialist with the National Audubon Society and initiator of the volunteer program, was in attendance to pay tribute to the volunteers. In addition to project staff, the Fish and Wildlife Service was represented by Doug Buffington, Deputy Regional Director, Region 8 (Research); Marshall Jones, Chief, Endangered Species Division, Region 4; and Randy Perry, Chief, Endangered Species Research Branch, Patuxent Wildlife Research Center (Region 8). Each volunteer was presented with a specially-designed parrot shirt, a small stipend from the National Audubon Society, and a certificate of appreciation from the Fish and Wildlife Service to formally recognize their exemplary service.

photo by Eric Carlson

Front row, left to right: ***Whitney Tilt, Greg Harris, Gail Morgan, Becky Abel, Mark Duff, Karen Wilson, and Raul Perez-Rivera.***

Back row, left to right: ***Randy Perry, Marc Bosch, Doug Buffington, Kelly Brock, Jose Colon, Gerald Lindsey, Jose Vivaldi, Frank Wadsworth, Wayne Arendt, Marshall Jones, Dan Nolan, and Bernie Rios.***

ulation of some wild nests to stimulate pairs to produce two clutches of eggs a year, rather than the one clutch usually produced under natural circumstances. This technique, known as "double-clutching," involves removing the first clutch of eggs from a nest and taking the eggs into captivity for incubation. Removal of the eggs stimulates the pair to produce a second clutch, thereby greatly increasing yearly production. In 1987, this technique was used on two of the four active wild nests.

As a measure to prevent extinction of the species, as well as to learn more about its reproductive biology, a decision was made to established a captive population of Puerto Rican parrots. The effort began in 1971 with the transfer of two adult birds from the Puerto Rico Zoo at Mayaguez to an aviary in the Luquillo Mountains. Since 1973, the captive population has been increased by the collection of eggs from the wild for incubation and captive rearing, the salvaging of chicks from a variety of mishaps in the wild, and the production of young by captive pairs. Between 1981 and 1987, only two pairs produced fertile eggs. This year, however, for the first time, two other captive pairs produced fertile eggs — an exciting event for the parrot project. In addition, the development of an artificial insemination technique has resulted in the first fertile egg produced from a captive pair of the Hispaniolan parrot *(Amazona ventralis)*, a less threatened species being used as a research surrogate. Once perfected, the technique will be used on the Puerto Rican parrot. Recent changes at the aviary, including pair manipulations, modifications of husbandry practices, and changes in the aviary's physical structure give hope for even greater production of Puerto Rican parrots in the future.

photo by Noel F.R. Snyder

Puerto Rican parrots at nest in the Caribbean National Forest, Puerto Rico

Unfortunately, despite the fact that the parrot population has been slowly increasing over the past decade, the parrot's long-term survival is still not secure. A major concern is that, with the location of both the wild and captive flocks in the Luquillo Mountains, the species could be lost to a hurricane, disease, or fire. Therefore, plans are under way by the Puerto Rico Department of Natural Resources to establish a second captive population of parrots on the island away from the Luquillo Mountains. Additional plans include the establishment of a second wild population of parrots in the Rio Abajo forest owned by the Commonwealth.

The outlook for the recovery of the Puerto Rican parrot is optimistic; however, there is still much to learn about the species before comprehensive and long-term management strategies can be effective. Critical steps toward recovery will continue to include captive propagation, release of captive-produced parrots to bolster the wild population, protection of the wild population, management and protection of habitat (including nests), increased law enforcement and public awareness, and continued research on the requirements of captive and wild populations.

Twelve Listings

(continued from page 1)

Threatened species (summary in BULLETIN Vol. XI No. 6). The final rule was published June 12, 1987.

Two Puerto Rico Plants

The **elfin tree fern (*Cyathea dryopteroides*)** and **Cook's holly (*Ilex cookii*)** are rare plants native to the Central Cordillera of Puerto Rico. As a result of habitat loss, only about 70 of the tree ferns are thought to survive, and the total known holly population now stands at one mature tree and approximately 35 sprouts or seedlings. The few remaining plants are vulnerable to further degradation of their delicate mountaintop habitat by construction of communications facilities, road building and maintenance, and military training exercises. Both species were proposed September 25, 1986, for listing as Endangered (summary in BULLETIN Vol. XI No. 10), and the final rule was published June 16, 1987.

Running Buffalo Clover (*Trifolium stoloniferum*)

Although it is historically documented from seven States, with populations of at least local abundance, only four individuals of this species survive at one site in West Virginia. The owner of the property containing the site has been very cooperative with the Service in protecting the species; however, any population this small could be extirpated by such activities as trampling or other inadvertent destruction by humans or other animals; competition or diseases from introduced plants; and vandalism or unauthorized collecting. The Service proposed March 10, 1986, to list the running buffalo clover as Endangered (summary in BULLETIN Vol. XI No. 4), and the final rule was published June 5, 1987. Live shoots from the wild population have been propagated and viable seeds produced at the University of Kentucky. Some of these propagules will soon be ready for reintroduction into the clover's range as part of an overall recovery effort.

Jesup's Milk-vetch (*Astragalus robbinsii* var. *jesupi*)

Only three populations of this perennial herb are known to exist, all of them along the banks of the Connecticut River in Vermont and New Hampshire. The species, which has always been vulnerable to extinction because of its rarity, recently has come under more tangible threats. One danger is the increasing recreational use of the sites. Another threat is the potential for future hydropower projects that could either inundate the plants or adversely alter the scouring river flows each spring that maintain the open bedrock habitat upon which the species depends. The Service proposed December 19, 1985, to list the Jesup's milk-vetch as Endangered (summary in BULLETIN Vol. XI No. 1), and the final rule was published June 5, 1987.

Sacramento Mountains Thistle (*Cirsium vinaceum*)

This perennial grows on steep calcium carbonate deposits immediately adjacent to flowing springs in the Sacramento Mountains of southeastern New Mexico. Recent data indicate that there are 20 populations of the species with a total of 10,000 - 15,000 individuals. The thistle, which depends on springs and streams, is vulnerable to developments that would reduce or eliminate surface water. Trampling by livestock is another threat. A proposal to list the Sacramento Mountains thistle as Threatened and to designate its Critical Habitat was published in the May 16, 1984, *Federal Register* (summary in BULLETIN Vol. IX No. 6). The final listing rule was published June 16, 1987; however, the Critical Habitat proposal was with-

(continued on page 8)

Twelve Listings

(continued from page 7)

drawn on the grounds that it covered too broad an area. Even so, the U. S. Forest Service, which administers the land (Lincoln National Forest) containing about 90 percent of the thistle's sites, will work with the Service under other provisions of the Endangered Species Act to protect important habitat. The Forest Service already has given protection to several of the sites.

Rough-leaved Loosestrife (*Lysimachia asperulaefolia*)

A perennial herb with showy yellow flowers, the rough-leaved loosestrife is endemic to the coastal plain and sand hills of North and South Carolina. Within this region, the species occurs in the fire-maintained ecotones between long-leaf pine woodlands and pond pine pocosins (wetlands). Only 9 of the historically known 19 populations survive today, all of them in North Carolina. The others were eliminated by suppression of naturally occurring wildfires, which maintained the open areas needed by the plant; drainage and conversion of wetlands to silvicultural, agricultural, and other uses; residential and industrial development; impoundment of wetlands for recreational uses; and other factors. Because the remaining populations are vulnerable to these same threats, the rough-leaved loosestrife was proposed for listing as an Endangered species on April 10, 1986 (summary in BULLETIN Vol. XI No. 5). The final rule was published June 12, 1987.

Geocarpon minimum

This plant, the only species in a monotypic genus, is a small, succulent annual. Although 17 populations exist in Arkansas and Missouri, only 5 are considered vigorous. They are vulnerable to conversion of natural habitat to pasture lands, the impacts of off-road vehicles, and silvicultural practices. Because *G. minimum* is a pioneer species that tolerates little competition, overcrowding and shading from other plants — a consequence of vegetational succession — is another major threat. The Service proposed April 10, 1986, to list *G. minimum* as Threatened (summary in BULLETIN Vol. XI No. 5), and the final rule was published June 16, 1987.

* * * *

These listed species now are protected under the Endangered Species Act, the benefits of which are summarized in this BULLETIN at the end of the story on the proposal to list a Texas plant as Endangered (page 3).

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED U.S. Only	ENDANGERED U.S. & Foreign	ENDANGERED Foreign Only	THREATENED U.S. Only	THREATENED U.S. & Foreign	THREATENED Foreign Only	SPECIES* TOTAL	SPECIES HAVING PLANS
Mammals	27	20	242	5	0	22	316	23
Birds	60	16	141	5	2	0	224	55
Reptiles	8	6	60	10	4	13	101	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	24	6	0	84	45
Snails	3	0	1	5	0	0	9	7
Clams	28	0	2	0	0	0	30	21
Crustaceans	5	0	0	1	0	0	6	1
Insects	8	0	0	5	0	0	13	12
Plants	128	6	1	28	3	2	166	56
TOTAL	309	52	466	86	15	37	965	247**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 213
Number of species currently proposed for listing: 17 animals
26 plants

Number of Species with Critical Habitats determined: 97
Number of Cooperative Agreements signed with States: 47 fish & wildlife
27 plants

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ENDANGERED SPECIES

Technical Bulletin

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